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Research Article

# Unintended Pregnancies and Associated Factors among Contraceptive Users: a Study from Referral Hospitals in Brazzaville, Republic of Congo

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**Keywords** Contraception; Unintended Pregnancy; Contraceptive Methods; Associated Factors; Congo

## Abstract

**Background:** Unintended pregnancies constitute a real public health problem in low-income settings. Success in preventing unintended pregnancies is critical in reduction of both maternal and infant mortality.

**Objective:** To assess the prevalence of contraceptive use and of unintended pregnancies and to identify the correlates of unintended pregnancies among contraceptive users in Brazzaville, Congo.

**Methods:** This cross-sectional study enrolled 380 new mothers in two public maternities in Brazzaville. The data was collected using a structured questionnaire. Bivariate analysis using Chi-square test and logistic regression was used.

**Results:** Knowledge of contraceptive methods was high among respondents. Overall contraceptive prevalence was 72%:83% for natural and 17% for modern methods, respectively. Forty percent of pregnancies among contraceptives users were unintended. Use of natural methods (3.34[1.06-10.50], p=0.03) and women's lack of financial income (1.7[1.01-2.92], p=0.04) were associated with high risk of occurrence of unintended pregnancy. Partners' education level was inversely related to risk of unintended pregnancies (0.45 [1.01-2.92], p=0.004).

**Conclusions:** Enhancing counseling for better contraceptive use, promoting modern contraceptives and increasing men involvement in family planning should be considered by family health planners in Congo.

## Introduction

In sub-Saharan Africa, more than a quarter of the 40 million pregnancies that occurred in 2011 were unintended. Unintended pregnancy is an important public health issue because of its negative association with health outcomes for both mothers and children. Studies indicate that women with history of unintended pregnancy are at high risk of induced abortions [1,2]. Safe and legal induced abortions solve part of the unintended pregnancies problem in developed countries [3]. However, in most African settings, because safe and legal abortion is inaccessible to many women (except when proven that abortion is to save the woman's life), most abortions are performed clandestinely, which makes it difficult to measure their incidence and consequences [4]. Unsafe abortion is one of the major direct causes of maternal deaths in developing countries. The World Health Organization (WHO) estimated that about 6 million unsafe abortions occurred in Africa in 2008 [5], causing approximately 13% of the 678000 maternal deaths annually in this region [6].

Unintended pregnancy is associated with a number of adverse maternal behaviors and child health outcomes including inadequate or delayed initiation of prenatal care [2,7,8], low birth weight [9] and preterm births which in turn affect newborn and child mortality in sub-Saharan African setting. In addition, unintended pregnancy is one the most critical factors contributing to schoolgirl drop out in African settings [10], while education is a key determinant of women health, allowing them to make informed on reproductive and general health matters. Educated women have significantly lower rate of maternal mortality [11]. Therefore, greater success in preventing unintended pregnancies is crucial toward preventing both maternal and infant mortality.

Studies focusing on unintended pregnancy in low-resources settings have suggested a wide range of correlates. These studies found that correlates of unintended pregnancies include non-use or incorrect use of contraceptives [12-15], religion practiced, age of the woman, being unmarried, low-educational level and low income [10,16,17], high number of previous pregnancies and high number of previous births [16,18], husband willingness of pregnancy [14] and lack of dialogue on family planning issues in the couple [19].

Contraceptive methods comprise a set of procedures and techniques to prevent fertilization at least temporarily. These include natural and modern methods. Natural methods do not use external chemical or physical contribution to regulate natural fertility. They seek to reduce the chance of becoming pregnant by planning sexual intercourse according to fertility periods in the woman's monthly cycle. Natural methods include ovulation calendar, method of temperature and that of withdrawal at time of ejaculation [20,21]. Modern contraceptive methods use chemical or physical barriers for reducing the chance of becoming pregnant. They include implant, injection, pills, spermicidal, condom, and intrauterine contraceptive device [20,21].

Like in other sub-Saharan Africa countries, maternal mortality in Congo is among the highest in the world, currently estimated at 580 deaths per 100000 live births in 2008 [22]. Unsafe abortion-related deaths contribute to 41% of these deaths [23], suggesting high prevalence of unintended pregnancy. To date, factors associated with unintended pregnancies in Congo are poorly understood due to lack of data. This study aims at contributing to this closing this knowledge gap. This understanding is essential to reproductive health programs in the country by providing valuable information to public health officials and policy makers involved in implementation and monitoring of progress towards reducing unintended pregnancies and maternal mortality. This study aimed at assessing the prevalence of contraceptive use and of unintended pregnancies as well as at identifying the correlates of unintended pregnancies among contraceptive users.

## Methods

### Setting

The study took place in Brazzaville, capital of the Republic of Congo. Brazzaville has 1.2 million inhabitants, of whom 51% women with 20% of childbearing age [22]. Brazzaville is divided into7 sanitary districts, comprised of 33 public health centers and three functional referral hospitals (Talangai, Makelekele and Mpissa) with a capacity of 756 beds. Talangai and Makelekele are the largest with 72% of the total number of beds. The study was conducted in both maternities of Talangai and Makelekele. Data from a preliminary survey (conducted one month prior to the study), reported an average of 22 babies born per day in each maternity, i.e. an estimated total of 16060 births annually in both maternities.

### Study Design, Population and Sampling

This study adopted a cross-sectional design using a descriptive quantitative approach. It was conducted in both referral hospitals from May 19, 2008 to July 18, 2008. Women who gave births in the selected maternities were eligible to participate in the study. Women found in the maternity were included only if the delivery took place no longer than 48 hours prior to the launch of the study.

In order to determine the sample size, we used a single population proportion formula using the prevalence of contraceptive use obtained in the National Demographic Health survey of 44% [20], taking a sample alpha risk of 5% and 5% degree of precision. A sample of 380 women was estimated. During the study period, a total of 1760 childbirths took place in both study hospitals, an average of 880 births per site. Among them, we randomly selected 380 new mothers (i.e., 190 women per site) using systematic sampling. Participants were selected in each maternity based on the birth registers. If the selected woman was not identified in the maternity (i.e., in postpartum service, gynecology or neonatal service), she was immediately replaced by a new mother who matched the number on the register, without changing the sampling interval afterwards of 1/5. All participants were interviewed within 48 hours after childbirth.

### Data collection process

Participants answered a face-to-face pre-tested questionnaire administrated by trained health workers. The questionnaire included topics such as socio-demographic characteristics, reproductive history, women partner characteristics, and contraceptive history. We assessed contraception use during the previous 6 months before the beginning of the last pregnancy. Unintended pregnancy was assessed by the question "Did you stop using contraception before your last pregnancy?" Response options were "Yes" or "No". Each interview took approximately 20 to 30 minutes to complete.

### Data analysis

Descriptive statistics were used to determine study population characteristics as well as the prevalence of contraceptive methods used by women and that of unintended pregnancy. Univariate analysis comprised analysis of women socio-demographic related characteristics (age, mother education, income, religion, place of residence, partner education), reproductive health characteristics (parity, number of children in life, number of previous abortions and type of contraceptive used) and factors related to relationships in the couple assessed by the variable "dialogue in couple about contraception". After the descriptive analyses, bivariate and logistic regression was performed to assess associations between explanatory variables and unintended pregnancy. Group comparisons used Pearson Chi-2 or Fisher's exact tests. Logistic regression was used to identify the predictors of unintended pregnancy among contraceptive users. Odds Ratios (OR) with 95% confidence interval [24] were computed. Variables with a p-value lower than 0.20 in univariate analyses were considered eligible to enter the initial multivariate model (i.e. age, mother education level, income, partner education level, parity, type of contraceptive, dialogue about contraception in couple). The final multivariate model was obtained using a backward stepwise selection procedure based on the log-likelihood ratio test to eliminate non-significant variables ($p>0.05$) from the initial model. Statistical analyses were performed using Epi-info version 3.5.1 statistical software.

### Ethical Considerations

The study protocol was approved by the Ministry of Health and Population of the Republic of Congo. Each woman who agreed to participate in the study had received detailed verbal as well as written information on the aims of the study. Only women agreeing to respond to the questionnaire were included.

## Results

### Characteristics of the Study Population

The main characteristics of the study population are presented in the table 1. The mean age of the 380 women surveyed was 25.5

**Table 1**: Main socio-demographic and reproductive-health characteristics of the respondents.

| Socio-demographics | Frequency | % |
|---|---|---|
| *Age* | | |
| 15-18 | 65 | 17.1 |
| 19-25 | 130 | 34.2 |
| 26-35 | 157 | 41.3 |
| 36-45 | 28 | 7.4 |
| *Residence* (n=369)* | | |
| Makélékélé | 90 | 24.4 |
| Bacongo | 40 | 10.9 |
| Poto-Poto | 13 | 3.5 |
| Moungali | 48 | 13.0 |
| Ouenzé | 37 | 10.0 |
| Talangai | 115 | 31.2 |
| Mfilou | 26 | 7.0 |
| *Cohabitation with partner* | | |
| Yes | 367 | 96.6 |
| No | 13 | 3.4 |
| *Religion* | | |
| Catholic | 175 | 46.1 |
| Protestant | 58 | 15.3 |
| Revival Church | 129 | 33.9 |
| Others | 18 | 4.8 |
| *Education levels* | | |
| Primary or not all education | 28 | 7.4 |
| College | 272 | 71.6 |
| Grammar school | 65 | 17.1 |
| University | 15 | 3.9 |
| *Having income* | | |
| Yes | 158 | 41.6 |
| No | 222 | 58.4 |
| Reproductive live characteristics | | |
| *Number of pregnancies* | | |
| 1 pregnancy | 84 | 22.1 |
| 2-3 pregnancies | 147 | 38.7 |
| 4-5 pregnancies | 106 | 27.9 |
| 6 and above pregnancies | 43 | 11.3 |
| *Parity* | | |
| 1 birth | 124 | 32.6 |
| 2-3 births | 176 | 46.3 |
| 4-5 births | 67 | 17.6 |
| 6 and above births | 13 | 3.4 |
| *Number of children deaths* | | |
| 0 child death | 339 | 89.2 |
| at least one child death | 41 | 10.8 |
| *Number of abortions (n=282)* | | |
| 0 abortion | 124 | 44.0 |
| 1 abortion | 102 | 36.1 |
| 2 abortions | 45 | 16.0 |
| 3 abortions | 11 | 3.9 |
| *Number of children* | | |
| 1 child | 133 | 35.0 |
| 2-3 children | 178 | 46.8 |
| 4-5 children | 57 | 15.0 |
| 6 -7 children | 12 | 3.2 |

*Brazzaville has seven quarters.

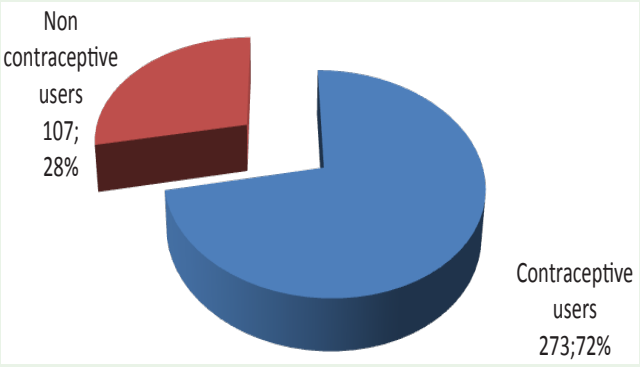


**Figure 1**: Overall contraceptive prevalence 6 months before the last pregnancy.

(Standard Deviation (SD) 6.4 years, range 15-45 years). The majority was very young: 195 (51%) were aged between 15 and 25 years; and 367 (97%) cohabited with a partner. Forty-six percent reported belonging to the catholic religion. The socioeconomic status of the study population was low: for 290 (79%) of the women, the highest level of education attained was college and 222 (58%) had no income. Regarding reproductive history, most of the women (253 (67%)) had 2 to 5 pregnancies before. As to the number of births, more than 6 out of 10 women had 2 to 5 births while more than half (56%) reported experience of abortion at least once. Concerning the number of children, more than 6 out of 10 women (65%) had at least two children and 41 (11%) had lost at least one child.

## Knowledge of contraceptives

Knowledge of contraceptive methods among the respondents was found high, but with wide disparities between methods. About 342 (90%) of the women surveyed knew at least one contraceptive method, 312 (82%) had knowledge on the calendar method, 160 (42%) on withdrawal, 256 (67%) on condoms, 171 (45%) on injection and 198 (52%) on oral contraceptive. However, knowledge of the Intra Uterine Device (IUD), implant, spermicidal and temperature methods was very low: 3% for IUD and 1%for others.

## Contraceptive Prevalence

Overall contraceptive prevalence is presented in the figure 1. Of the 380 new mothers, 273 (72%) reported using contraception during the 6 months preceding the last pregnancy while the remaining 107 (28%) reported non-use of contraceptive methods.

There was no difference between users and non-users regarding age and education levels. The results show wide disparities in contraceptive methods used, 227 (83%) women had used natural contraception and 46 (17%) had used modern contraception.

Furthermore, a distribution of contraceptive users according to the type of contraceptive shows that calendar method and condoms were mostly used, by respectively 211 (77.3%) and 25 (9.2%) of the women. Concerning the others natural contraceptive methods, withdrawal and temperature represented 15 (5.5%) and 1(0.4%) respectively. The remaining modern methods (injection and pills) represented 7 (2.5%) and 14 (5.1%). Intrauterine contraceptive

**Table 2:** Specific contraceptive methods used 6 months before the last pregnancy.

| Contraceptive Methods | Prevalence Contraceptive By Method n (%) | Unintended Pregnancy By Method n (%) | Unintended Pregnancy among users Of the same Method n (%) |
|---|---|---|---|
| Natural Contraception | | | |
| Ogino Knaus | 211(77.3)* | 79(73.2)** | 79.(37.4)*** |
| Withdrawal | 15(5,5) | 9(8.3) | 9(60.0) |
| Temperature | 1(0,4) | 0 (0.0) | 0.(0.0) |
| *Sub-total natural contraception* | | 88(81.5) | |
| Modern Contraception | | | |
| Implant | 0(0) | - | - |
| Injectable | 7(2.5) | 0 (0.0) | 0.(0.0) |
| Pills | 14(5.1) | 4 (3.7) | 4.(28.5) |
| Condom | 25(9,2) | 16.(14.8) | 16 (59.2) |
| Intra uterine contraceptive device | 0 | - | - |
| *Sub-total modern Contraception* | | 20(18.5) | |
| Total | **273 (100)** | **108.(100)** | - |

*Among 273 contraceptive users, 211 (77.3%) had used calendar method
**Among 108 unintended pregnancy, 79 (73.2%) occurred among calendar method users
***Among 211 calendar method users, 79 (37.4%) did not stop contraception at the time they got pregnant (i.e. unintended pregnancy) and the remaining 132 (62.6%) had stopped contraception at the time they got pregnant.

devices, implants and spermicidal were not used by women included in this study. Table 2 provides the details on specific contraceptive prevalence.

The results show a disparity of unintended pregnancy according to the type of contraception as detailed in table 2. Unintended pregnancy was primarily high among users of natural contraception (88 cases or 81.5%), whereas the remaining 20 (18.5%) had occurred among users of modern contraception.

## Prevalence of Unintended Pregnancies among Contraceptive Users

About 108 (40%) of 273 women contraceptive users had unintended pregnancy and the remaining 165 (60%) had intended pregnancy (see figure 2).

As to the prevalence of unintended pregnancies per methods used, the calendar method appears widely to be the method whose users reported the most elevated number of unintended pregnancies with 79 (73.2%), followed by condoms use representing 16 (14.8%) of cases, withdrawal method with 9 (8.3%) and users of pills with 8.3%. Regarding the number of unintended pregnancy among users of the same method of contraception, withdrawal or condoms methods resulted to more unintended pregnancies than the use of all others methods. Indeed, among the fifteen new mothers who reported use of withdrawal method before the last pregnancy, 9 (60%) of pregnancies were result of failure of this method versus 16 (59.2%) among the 25 users of condoms. Calendar method or pills failure was also common: among 211 women who used calendar and four women

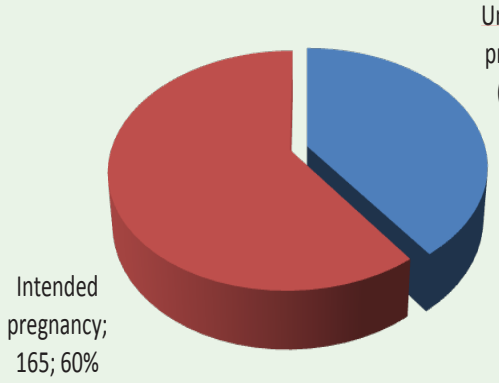


**Figure 2**: Overall prevalence of unintended and intended pregnancies among contraceptive users.

who used pills, the proportions of unintended pregnancy were 37.4% and 28.5%, respectively. However, no unintended pregnancy was observed among injection method or temperature methods users.

This study shows that the prevalence of unintended pregnancy varied according to women socio-demographic characteristics. Up to 88 (42%) of contraceptive users with low educational level (primary level or no education at all) had experienced unintended pregnancy compared to 19 (30%) among women whose education was higher (secondary school and university). Likewise, 37% of women with income as compared to 47% of without reported unintended pregnancies. Catholic religious women had the highest prevalence of unintended pregnancy (42%), compared to 35% of women with other religious backgrounds. Women aged from 15 to 29 years had a prevalence of 41% of unintended as compared to 36% among those aged from 20 to 35 years (See Table 3).

## Factors Associated with Unintended Pregnancies among Contraceptive Users

The results of both univariate and multivariate analyses are presented in Table 3. The univariate analysis shows that women who had used natural contraception were significantly more likely to experience unintended pregnancy than users of modern contraception (OR= 3.09 [1.01-9.50], p=0.04). As to financial status, women who had no income were more likely to have an unintended pregnancy than those who had income (OR=1.71 [1.02-2.86]), but the relationship was not statistically significant. Regarding women's partner education, those whose partner had an education level beyond college were less likely to experience unintended pregnancies than women with lower educational level (OR=0.47 [0.28-0.79], p=0.005). In addition, the women's age was also found to be significantly associated with occurrence of unintended pregnancy: women aged from 20 to 34 years were less more likely to experience unintended pregnancy than those from 15 to 19 years of age (OR=0.50 [0.62-0.93], p=0.03).

In multivariate analysis and after adjustment, natural contraception use and not having income were independent factors most affecting the occurrence of unintended pregnancies. In addition, women whose partners' education was beyond college level were 40% less likely to experience unintended pregnancy than women whose partners' education level below college level.

**Table 3:** Factors associated with unintended pregnancy among contraceptive users (univariate and final multivariate analysis, n=273).

| | | | | Crude OR | IC (95%) | P | Adjusted OR | IC (95%) | P |
|---|---|---|---|---|---|---|---|---|---|
| **Socio-demographic characteristics** | | | | | | | | | |
| **Age**[a] | | | | | | | | | |
| **15-19 (Ref.)** | 51 | 27(53) | 24(47) | 1 | | | | | |
| **20-34** | 200 | 72(36) | 128(64) | 0.50 | 0.62-0.93 | 0.03 | | | |
| **35-45** | 22 | 9(41) | 13(59) | 0.61 | 0.22-1.69 | 0.34 | | | |
| **Mother education** [a] | | | | | | | | | |
| **≤College (Ref.)** | 210 | 89(42) | 82(54) | 1 | | | | | |
| **> College** | 63 | 19(30) | 83(69) | 0.54 | 0.28-1.01 | 0.050 | | | |
| **Mother income**[a] | | | | | | | | | |
| Yes **(Ref.)** | 91 | 57(35) | 107(65) | 1 | | | | | |
| No | 112 | 51(47) | 57(53) | 1.47 | **1,02-2,85** | **0.041** | **1,75** | **1.012-2.97** | **0.034** |
| **Religion** | | | | | | | | | |
| **Catholic (Ref.)** | 185 | 77(42) | 108(58) | 1 | | | | | |
| **Others** | 88 | 31(35) | 57(65) | 0.71 | **0,41-1,23** | **0,229** | | | |
| **Residence** | | | | | | | | | |
| **North Brazzaville *(Ref.)** | 125 | 52(42) | 73(58) | 1 | | | | | |
| **Center Brazzaville **** | 47 | 22(47) | 25(53) | 1.51 | 0.71-3.19 | 0.274 | | | |
| **South Brazzaville**** | 95 | 33(35) | 62(65) | 1.25 | 0.70-2.22 | 0.438 | | | |
| **Partner education**[a] | | | | | | | | | |
| **≤College (Ref.)** | 152 | **70(46)** | **121(58)** | 1 | | | 1 | | |
| **> College** | 121 | **38(31)** | **44(70)** | 0.47 | **0.27-0.79** | **0.005** | **0.45** | **0.26-0.78** | **0.004** |
| **Reproductive health characteristics** | | | | | | | | | |
| **Parity**[a] | | | | | | | | | |
| **1 birth (Ref.)** | 85 | **39(46)** | **46(54)** | 1 | | | | | |
| **2-3 births** | 128 | **44(34)** | **84(66)** | 0.61 | **0.35-1.08** | **0.09** | | | |
| **4 and above births** | 60 | **25(42)** | **35(58)** | 0.84 | **0.84-0.43** | **0.62** | | | |
| **Number of children** | | | | | | | | | |
| **1-2** | 185 | 59(39) | 93(61) | 0.52 | 0.52-1.43 | 0.582 | | | |
| **3 and above children (Ref.)** | 88 | 49(40) | 72(60) | 1 | | | | | |
| **Experienced abortions** | | | | | | | | | |
| **Yes** | 27 | 43(37) | 72(63) | 1.07 | **0,62-1,8** | **0,800** | | | |
| **No (Ref.)** | 246 | 32(35) | 59(65) | 1 | | | | | |
| **Type of contraceptive used**[a] | | | | | | | | | |
| **Modern (Ref.)** | 46 | **20(19)** | **26(81)** | **1** | | | 1 | | |
| **Natural** | 227 | **88(42)** | **139(58)** | **3.09** | **1.01-9.50** | **0.040** | **3.40** | **1.08-10.70** | **0.036** |
| **Dialogue with partner about family planning**[a] | | | | | | | | | |
| **Frequent (Ref.)** | 28 | 9(32) | 19(68) | 1 | | | | | |
| **Rather frequent** | 58 | 22(38) | 36(62) | 1.21 | 0.44-3.31 | 0.704 | | | |
| Rather less frequent | 86 | 40(47) | 46(62) | 2.01 | 0.78-4.22 | 0.147 | | | |
| No dialogue at all | 101 | 37(37) | 64(63) | 1.28 | 0.50-3.28 | 0.603 | | | |

**[a] Variables included in multivariate analysis**
*** North Brazzaville includes Talangai and Mfilou**
**** Center Brazzaville includes Poto-Poto, Ouenze and Moungali**
** South Brazzaville includes Makelekele and Bacongo.

## Discussion

This study assessed the prevalence of contraceptives use and its association with unintended pregnancy among contraceptive users using a sample of women who gave birth in referral hospitals in Brazzaville, Congo.

The study found a high prevalence of contraceptive use (72%) among women during the last 6 months prior to pregnancy. This is inconsistent with the Demographic Health Survey in 2012 (DHS-2012) which reported a contraceptive prevalence rate average of 44 percent among women 45-49 years between 2011 and 2012 in Congo [24]. One plausible explanation of this difference could be women's matrimonial status. In our study, 97% of the women reported cohabitating with partners, contrasting with only 58% of women in the DHS-2012. It is probable that sexual activity is regular- and therefore pregnancy risks higher-in women living in unions as compared to women living outside of such unions. This may explain frequent contraception use among them. Therefore, high proportion of women living alone can explain a large part of the low contraceptive prevalence rate reported in DHS-2012 as in other studies conducted in general population in African context [25,26].

Analysis of the frequency of methods used revealed that natural contraceptive methods were the most preferred method among women in Brazzaville (17% versus 83 %), which is in line with the trends observed in DHS-2012 [24]. The low use of modern contraception can be explained by several factors. First, there is lack of knowledge about modern contraceptive methods among women as reported in this study. In addition, having many children is still highly valued in Congo contexts. Thus, acquiring a contraceptive in a health facility or pharmacy still carries the risk of stigmatization. Another factor that may limit use of modern contraceptives among women is financial capacity. In Congo, despite a successful integration of family planning services in health centers, contraceptives still imply direct financial costs for users. This study's results suggest promoting appropriate counseling on modern contraceptive methods and calls for a set of measures to overcome financial barriers, in order to increase the utilization of modern contraceptive in Congo.

At the same time, it should not be taken for granted that knowledge and use of natural contraceptive methods is always accurate. A study in Nigeria showed that this not always the case [25]. Both types of methods need therefore to be equally valued and promoted.

One critical finding in this study is that unintended pregnancy (i.e. pregnancy occurring in the woman who was using contraception at the time they got pregnant) was common in this sample: four in ten pregnancies were unintended. Mabiala Babela et al. [27] found that prevalence of unintended pregnancies of 32% in Brazzaville, but this was among young girls. This figure seems rather normal, as it is similar to other findings from a study in Ethiopia that reported a 32% rate of unintended pregnancies [26]. But socially and economically deprived settings such as urban slums might indicate higher rates, as reported in Kenya with a frequency of about 40% and more [27]. However, our study is the first in Congo to focus on unintended pregnancy in terms of contraception failure among women in early post-partum period.

Low effectiveness of natural contraceptive methods as compared to modern ones has been demonstrated in several studies [28-30]. Our findings are in line with these studies in that the risk to be pregnant when using natural contraceptive was more than threefold compared with using modern contraceptive. These findings suggest either low efficacy, or imperfect use of them, or both, by women in this study, which is once again consistent with the Nigerian study by Audu et al. [25].

Low income level appears to be associated with unintended pregnancy. This is the first who assessed relationship between socio-economic status and unintended pregnancy in Congo. However, this is consistent with previous research on socio-economic inequalities in African context [31,32]. These data suggest that economically active women have increased access to quality information facilitating better choice and use of contraceptive methods. They have higher likelihood of participating in social networks that support family planning and reduced fertility than their financially poorer counterparts [31]. In this context, strategies for reinforcing women income generation are likely to impact on reduced unwanted pregnancy.

Finally, the study's findings show that women with less educated partners were significantly more likely to report unintended pregnancy than their counterparts with more educated partners. This result is crucial in the Congolese context where family planning interventions focus almost exclusively on women. It is worth of note that previous studies conducted in other African contexts revealed that the main barriers to the use of modern contraceptives as described by women were negative attitudes of men and the fear of side effects [32,33]. Such findings suggest that involving male partners in women's contraceptive decisions may be a winning strategy in term of increasing acceptance of contraceptive use, and preventing contraceptive failure in couples.

Some limitations should be acknowledged in this study. As in most studies on this subject, the assessment of contraceptive use and of the frequency of unintended pregnancy was based upon self-reports, which is known to be affected by social desirability bias [34]. In addition, we have not included women from other maternities Brazzaville. These findings might therefore not apply to women who delivered at lower level facilities in the health system in Congo. In addition, bias induced by face-to-face interviews was however reduced by training counselors in the use of non-judgmental approaches. Even if a large majority of respondents were considered truthful by interviewers, answering questions dealing with sensitive issues such as reproductive behaviors in a hospital setting can be frustrating. However, several studies have demonstrated reliability of such methods, hence their extensive use in several countries [35,36].

## Conclusion

Low contraceptive prevalence of modern methods and high frequency of unintended pregnancies are main features among women in Brazzaville. Increased counseling for perfect use of natural contraception, promotion of modern contraceptive and improvement men involvement in family planning are main factors that reproductive health programs should aim to focus on to reduce unintended pregnancy. Programs aimed at reinforcing women income acquisition are also needed.

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## Author's Contributions

Gilbert Ndziessi and Michel Bitemo contributed substantially to conception and design of the study and collected the data. Gilbert Ndziessi performed the statistical analysis, wrote the original draft of the manuscript and managed the literature searches. Berthollet Bwira Kaboru and Michel Bitemo advised on data analysis and discussion. All the authors were involved in reviewing the draft.

## References

1. Ekanem EI, Etuk SJ, Ekabua JE, Iklaki C. Clinical presentation and complications in patients with unsafe abortions in University of Calabar Teaching Hospital, Calabar, Nigeria. Niger J Med. 2009; 18: 370-374.
2. Cleland J, Ali MM. Reproductive consequences of contraceptive failure in 19 developing countries. Obstet Gynecol. 2004; 104: 314-320.
3. Sedgh G, Henshaw S, Singh S, Ahman E, Shah IH. Induced abortion: estimated rates and trends worldwide. Lancet. 2007; 370: 1338-1345.
4. Tadesse E, Yoseph S, Gossa A, Muletta E, Pogharian D, Ketsella K, et al. Illegal abortions in Addis Ababa, Ethiopia. East Afr Med J. 2001; 78: 25-29.

5. World Health Organization. Unsafe abortion: Global and regional estimates of the incidence of unsafe abortion and associated mortality in 2008. 2011.

6. Khan KS, Wojdyla, Say L, Gulmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. Lancet. 2006; 367: 1066-1074.

7. Mayer JP. Unintended childbearing, maternal beliefs, and delay of prenatal care. Birth. 1997; 24: 247-252.

8. Hulsey TM. Association between early prenatal care and mother's intention of and desire for the pregnancy. J Obstet Gynecol Neonatal Nurs. 2001; 30: 275-282.

9. Shah PS, Balkhair T, Ohlsson A, Beyene J, Scott F, Frick c. Intention to become pregnant and low birth weight and preterm birth: a systematic review. Matern Child Health J. 2011; 15: 205-216.

10. Ikamari L, Izugbara C, Ochako R. Prevalence and determinants of unintended pregnancy among women in Nairobi, Kenya. BMC Pregnancy Childbirth. 2013; 13: 69.

11. WHO. Health in Asia and the Pacific. 2008.

12. Forrest JD. Epidemiology of unintended pregnancy and contraceptive use. Am J Obstet Gynecol. 1994; 170: 1485-1489.

13. Adetunji JA. Unintended Childbearing in Developing Countries: Levels, Trends, and Determinants. DHS Analytical Reports. 1998.

14. Sedgh G, Bankole A, Oye-Adeniran B, Adewole IF, Singh S, Hussain R. Unwanted pregnancy and associated factors among Nigerian women. Int Fam Plan Perspect. 2006; 32: 175-184.

15. Kamal M, Islam A. Prevalence and socioeconomic correlates of unintented pregnancy among women in rural Bangladesh. Salud Publica Mex. 2011; 53: 108-115.

16. Adhikari R, Soonthorndhada K, Prasartkul P. Correlates of unintended pregnancy among currently pregnant married women in Nepal. BMC Int Health Hum Rights. 2009; 9: 17.

17. Shaheen AA, Diaaeldin M, Chaaya M, El Roueiheb Z. Unintended pregnancy in Egypt: evidence from the national study on women giving birth in 1999. East Mediterr Health J. 2007; 13: 1392-1404.

18. Kassa N, Berhane Y, Worku A. Predictors of unintended pregnancy in Kersa, eastern Ethiopia, 2010. Reprod Health. 2012; 9: 1.

19. Faye CM, Speizer IS, Fotso JC, Corroon M, Koumtingue D. Unintended pregnancy: magnitude and correlates in six urban sites in Senegal. Reprod Health. 2013; 10: 59.

20. Enquete Demographique et de santé du Congo EDSC-I 2005. 2006.

21. WHO. Medical eligibility criteria for contraceptive use. 2015.

22. WHO, Congo Factsheets of Health Statistics 2010.

23. PNDS Congo, Programme national de developpement sanitaire (PNDS) Congo 2006-2010. 2006.

24. Erol N, Durusoy R, Ergin I, Doner B, Ciceklioglu M. Unintended pregnancy and prenatal care: a study from a maternity hospital in Turkey. Eur J Contracept Reprod Health Care. 2010; 15: 290-300.

25. Audu BM, Yahya SJ, Bassi A. Knowledge, attitude and practice of natural family planning methods in a population with poor utilisation of modern contraceptives. J Obstet Gynaecol. 2006; 26: 555-560.

26. Wado YD, Afework MF, Hindin MJ. Unintended pregnancies and the use of maternal health services in Southwestern Ethiopia. BMC Int Health Hum Rights. 2013; 13: 36.

27. Beguy D, Mumah J, Gottschalk L. Unintended Pregnancies among Young Women Living in Urban Slums: Evidence from a Prospective Study in Nairobi City, Kenya. PLoS One. 2014; 9: e101034.

28. Trussell J, Grummer-Strawn L. Contraceptive failure of the ovulation method of periodic abstinence. Fam Plann Perspect. 1990; 22: 65-75.

29. Hughes J. Natural family planning: very risky business. Conscience. 1988; 9: 7-12.

30. Moreau C, Trussell J, Rodriguez G, Bajos N, Bouyer J. Contraceptive failure rates in France: results from a population-based survey. Hum Reprod. 2007; 22: 2422-2427.

31. Mosha IH, Ruben R. Communication, knowledge, social network and family planning utilization among couples in Mwanza, Tanzania. Afr J Reprod Health. 2013; 17: 57-69.

32. Jinadu MK, Ajuwon B. Traditional fertility regulation methods among the Yoruba of southwestern Nigeria. II. A prospective study of use-effectiveness. Afr J Reprod Health. 1997; 1: 65-73.

33. Moronkola OA, Ojediran MM, Amosu A. Reproductive health knowledge, beliefs and determinants of contraceptives use among women attending family planning clinics in Ibadan, Nigeria. Afr Health Sci. 2006; 6: 155-159.

34. Bunnell R, Ekwaru JP, Solberg P, Wamai N, Bikaako-Kajura W, Were W, et al. Changes in sexual behavior and risk of HIV transmission after antiretroviral therapy and prevention interventions in rural Uganda. AIDS. 2006; 20: 85-92.

35. Ndziessi G, Cohen J, Kouanfack C, Marcellin F, Carrieri MP, Laborde-Balen G, et al. Susceptibility to transmitting HIV in patients initiating antiretroviral therapy in rural district hospitals in Cameroon (Stratall ANRS 12110/ESTHER Trial). PLoS One. 2013; 8: e62611.

36. Okonofua FE, Odimegwu C, Ajabor H, Daru PH, Johnson A. Assessing the prevalence and determinants of unwanted pregnancy and induced abortion in Nigeria. Stud Fam Plann. 1999; 30: 67-77.